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09/527,761	03/17/2000	Brian C. Barker	BU9-99-157	3261

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EXAMINER

LEE, SEUNG H

ART UNIT

PAPER NUMBER

2876

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/527,761

Applicant(s)

BARKER ET AL.

Examiner

Seung H Lee

Art Unit

2876

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 28-67 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Receipt is acknowledged of the response filed on 18 March 2003, which has been entered in the file.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 6, 9, 13, 22, 37, 40, 43-45, 51, 54, 55, 58, 60, 63, and 64 rejected under 35 U.S.C. 102(e) as being anticipated by Bacchi et al. (US 5,894,348, of the record)(hereinafter referred to as 'Bacchi').

Bacchi teaches a plurality of pits or scribe markers (18) shaped in circle, wherein the markers are located on a front side of the semiconductor wafer (20) in which the pits are arranged in digital information-providing pattern (i.e., alphanumeric characters) wherein a scribe mark reader (10) reads the pits during production process using diode array (16), and the adequate or detectable contrast between the background and the image of the mark, the markers are readable by a reader's eye, the pits (28) are

oriented differently defined by each of an associated axis (see Figs. 1, 3-5; col. 1, line 15- col. 2, line 27; col. 4, line 13-col. 8, line 52).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7, 8, 10, 16, 21, 28-30, 33-35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Duncan et al (US 4,585,931, of the record)(hereinafter referred to as 'Duncan').

The teachings of Bacchi have been discussed above.

In addition to the teachings of Bacchi as discussed above, he also teaches a character is consist of a plurality of pits (28) having a space between each pits (see Fig. 5, col. 4, line 13-24).

However, Bacchi teaches the pits are arranged in information providing pattern, he fails to teach or fairly suggest that the pattern have long and short pits.

Duncan teaches that the bar codes on the wafer are varying by width and height or a first shape and a second shape and the light striking spaces (21) between the pits (15 and 18) form the interference fringes in which defines by the depth of the space (21) and the rays of light are reflected with a phase change (θ) (39, 39', 39'', and 39''')

wherein the reflected beam does not reaches the sensing device (39) considered as non-reflected (see Figs. 1-3; col. 3, lines 49-60; col. 5, line 21-47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Duncan to the teachings of Bacchi in order to improve the readability of the information mark of the wafer by scattering the rays of light onto the surface of the wafer. Although, Bacchi as modified by Duncan and Young fail to particularly teach or fairly suggest that the height and width of the pits and the distance between each pits, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Duncan to the teachings of Bacchi, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

6. Claims 11, 12, 17-19, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Young et al (US 5,792,566, of the record)(hereinafter referred to as 'Young').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits are on the semiconductor wafer, they fail to teach or fairly suggest that the pits are perpendicular to a top surface and a bottom surface of the wafer.

However, Young teaches the pit (172) is grooved on the side surface of the wafer extending from the front surface of the wafer to a back surface of the wafer when the

wafer of Fig. 1 is cut horizontally wherein the pit is perpendicular to a top surface and a bottom surface of the wafer (see Fig. 1-3; col. 2, line 55- col. 4, line 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Young to the teachings of Bacchi in order to align/stack the wafers by matching the information mark or pits of wafers. Moreover, such modification would provide the faster processing means by aligning/stacking the wafers based on the pits provided thereon which is in the position for next processing steps. Although, Bacchi as modified by Young fail to particularly teach that the groove is curved on the boule, it would have been an obvious design variation well within the ordinary skill in the art failing to provide any unexpected results for aligning/stacking the wafer by the matching location of the pits of wafer, and therefore an obvious expedient.

7. Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi as modified by Duncan, and further in view of Young et al (US 5,792,566, of the record)(hereinafter referred to as 'Young').

The teachings of Bacchi/Duncan have been discussed above.

Although, Bacchi/Duncan teach that the pits are on the semiconductor wafer, they fail to teach or fairly suggest that the pits are arranged the back surface of the wafer.

However, Young teaches the pit (172) is grooved on the side surface of the wafer extending from the front surface of the wafer to a back surface of the wafer when the

wafer of Fig.1 is cut horizontally wherein the pit is perpendicular to a top surface and a bottom surface of the wafer (see Fig. 1-3; col. 2, line 55- col. 4, line 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Young to the teachings of Bacchi/Duncan in order to improved and enhanced procedure of reading operation means wherein aligning/stacking of the wafers by matching the information mark or pits of wafers located on the back surface of the wafer would expedite the reading processing since the reader can read the information or pits from any given position, and therefore an obvious expedient.

8. Claims 14 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Yano et al (US 6,268,641, of the record)(hereinafter referred to as 'Yano').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits on the semiconductor wafer, they fail to teach or fairly suggest that a laser reading device is reading information.

However, Yano teaches the laser-reading device can be used for reading of the identification mark (16) on the wafer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the conventional laser reading device of the Yano for the reader of the Bacchi in order to improve a readability of the information marks or pits

means wherein the information marks or pits are canned precisely and accurately using the laser reading device, and therefore an obvious expedient.

9. Claims 15, 36, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Brown et al. (US 5,976,768)(hereinafter referred to as 'Brown').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits on the semiconductor wafer, they fail to teach or fairly suggest that the pits is coated with silicon carbide.

However, Brown teaches the wafer (2400) having an implants (2408) in which are separated by space troughs (2802), and a silicon dioxide material (302) is coated and filled the implant and the space troughs (see Figs. 31 and 33; col. 15, line 45- col. 16, line 14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings Brown to the teachings of Bacchi in order to provide a efficient means for preventing/reducing the wear and tear-off of the surface of the wafer by coating the surface of the wafer. Moreover, such modification would provide the clear reading of the pits since the coating of the wafer surface prevent dust materials from resting within the pits, and therefore an obvious expedient.

10. Claims 20, 31, 32, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Iwai (US 4,418,567, of the record).

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits on the semiconductor wafer, they fail to teach or fairly suggest that the pits having a location reference information.

However, Iwai teaches that a location mark (114) providing the location information and information marks (116a, 116b, and 116c) providing the wafer's information on the curved sidewalls (see Figs. 9 and 11; col. 7, lines 6-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings Brown to the teachings of Bacchi in order to an easier recognition of the information means the operator(s) can verify/acknowledge the information written on the wafer without using particular device to decode the information thereon the wafer. Moreover, such modification would provide an automated processing, that is, the operator(s) or computer can be instructed the processing procedure by decoding/reading the information marks, and therefore an obvious expedient.

11. Claim 53 rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Makinouchi et al (US 4,958,082, of the record)(hereinafter referred to as 'Makinouchi').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the reading device for reading the pits on the semiconductor wafer, they fail to teach or fairly suggest that the reading device comprises an interferometer.

However, Makinouchi teaches the position of wafer (2) is detected by the interferometer (2) (see Figs. 1 and 2; col. 1, lines 12-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings Makinouchi to the teachings of Bacchi in order to an improved and an enhanced means for detecting the orientation of the wafer automatically using the interferometer. Moreover, such modification would speed-up the reading process of the information written on the wafer since the reading device can be focus on targets area using the interferometer, and therefore an obvious expedient.

12. Claims 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Moh et al (US 6,214,250, of the record)(hereinafter referred to as 'Moh').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits on the semiconductor wafer contrast with surrounding portion of wafer, they fail to teach or fairly suggest that the pits are altered and invalidated.

However, Moh teaches labels are changed during the course of process wherein the code patterns formed previously are altered to invalidate (see col. 2, line 61- col. 3, line 38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Moh to the teachings of Bacchi in

order to provide an enhanced reading means by recognizing the pits having a different color contrasting with region around the pits. Moreover, such modification would provide an user friendly processing means operator(s) can verify/acknowledge/check the status of the process by reading the code patterns on the wafer at any given particular time since the code patterns are changing/updating constantly as each processing step is completed, and therefore an obvious expedient.

13. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Moh and Huang et al (US 5,330,924)(hereinafter referred to as 'Huang').

The teachings of Bacchi and Moh have been discussed above.

Although, Bacchi as modified by Moh teach that the pits on the semiconductor wafer contrast with surrounding portion of wafer, they fail to teach or fairly suggest that the pits are arranged in the an ion implant region to provide a contrast.

However, Huang teaches that the ion implantation is used to characterize the wafer (see Figs. 7 and 8; col. 4, lines 36-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the well-known method of ion implant as taught by Huang with the method of composite label as taught by Bacchi as modified by Moh in order to provide the conductance to wafer, and therefore an obvious expedient.

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14. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Wen (US 5,834,819).

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits are arranged on the semiconductor wafer, he fails to teach or fairly suggest that the pattern of pits is a quaternary-coded pattern having at least three different shapes.

However, Wen teaches the quaternary code is used to encode the data (see Figs. 3A-3H; col. 5, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the well-known the quaternary code system as taught by Wen to the teachings of Bacchi in order to increase the storage capacity since the quaternary code can store more information than 1 or 2 dimensional bar code, and therefore an obvious expedient.

15. Claims 56, 57, 61, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Zhang (US 5,245,165).

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits are arranged on the semiconductor wafer, he fails to teach or fairly suggest that the pattern of pits is comprised at least three different shapes.

However, Zhang teaches a glyph code having at least three different shapes (see Fig. 3; col. 2, lines 3-28; col. 3, lines 7-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Zhang to the teachings of Bacchi in order to increase the storage capacity using the glyph code wherein the glyph code has a multiple shape representing the different values respectively. Although, Bacchi as modified by Zhang fail to particularly teach that the pits can have different shape including a circle, an oval, and a rectangular. However, it would have been an obvious design variation well within the ordinary skill in the art failing to provide any unexpected results for choosing/designing the shape of the pits to increase capacity for storing information therein, and therefore an obvious expedient.

16. Claims 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacchi in view of Grandia et al (US 4,084,354)(hereinafter referred to as 'Grandia').

The teachings of Bacchi have been discussed above.

Although, Bacchi teaches that the pits are arranged on the semiconductor wafer, he fails to teach or fairly suggest that the wafer boule having a sequence start notch along a longitudinal surface of boule and a helically shaped sequence notches along a longitudinal surface of boule.

However, Grandia teaches a wafer boule having the sequence start notches (44) along a longitudinal surface of boule and a helically shaped sequence notches (10) along a longitudinal surface of boule (see Figs. 1A and 4A; col. 1, lines 12-60; col. 3, lines 45-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Grandia to the teachings of Bacchi in order to provide an improved and an enhanced cutting means the notches of wafer boule provide an crystallographic orientation of the wafer boule to align with cutting blade during the slicing operation. Although, Bacchi as modified by Grandia fail to particularly teach that the sequence start notches and a helically shaped sequence notches are arranged onto same wafer boule, it would have been an obvious design variation well within the ordinary skill in the art failing to provide any unexpected results for incorporating the two different notches type as taught by Grandia, and therefore an obvious expedient.

Allowable Subject Matter

17. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:

Although, the best prior art of record to Bacchi, Duncan, Young, Yano, Brown, Iwai, Kakinouchi, and Moh teaches the wafer comprising a plurality of pits for providing information therewith. However, Bacchi, Duncan, Young, Yano, Brown, Iwai, Kakinouchi, and Moh taken alone or in combination of other references, fail to specifically teach or fairly suggest that each group of pits includes a machine-readable

set of spaces for pits and each space comprising 2 column each comprising 32 pits as set forth in the claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Amendment

19. Applicant's arguments filed 18 March 2003 have been fully considered but they are not persuasive.

In response to the applicant argument *that "Bacchi et al. does not disclose a semiconductor wafer....."* (see page 4, line 4+), the Examiner respectfully disagrees with the applicant wherein Bacchi clearly teach the semiconductor wafer (200) having a plurality of pits or scribe marks thereon to providing information therewith in form of other than barcode pattern. Also Bacchi teaches a method of encoding of such a plurality of pits using a laser to melt the substrate as discussed in paragraph 3 above.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the dimension (e.g., a length of pits, a width of pits, and a depth of pits) of the pattern for presenting information on the wafer can be various shapes as shown by Duncan by distinguishing spaces between the pattern, using different width of the pattern, etc., and therefore using a particular width, length, height to forming pits are obvious as discussed in paragraph 5 above.

In response to applicant argument that "*Young et al. is directed to the solution of a completely different technical problem...*" (see page 10, line 13+), the Examiner respectfully disagrees with the applicant wherein Young simply teach the forming information providing pattern from a top of the wafer extending to a bottom of the wafer. Therefore, when interpreting the claimed limitations as broadly as is reasonably possible, the combination of the teachings of Young and the teachings of Bacchi still meets the claimed invention as discussed in paragraph 6 above.

In response to the applicant's argument that "*Brown et al. is clearly silent to any disclosure of any information pattern...*" (see page 14, line 15+), the Brown simply provide an evidence of coating of the wafer using the silicon dioxide. Therefore, when interpreting the claimed limitations as broadly as is reasonably possible, the combination of the teachings of Brown (as described above) and the teachings of Bacchi still meets the claimed limitation.

In response to the applicant's argument that "*Huang et al. is directed to a method of making ...*" (see page 14, line 15+), the Huang simply provide an evidence of using

ion implant method to encoding information on the wafer. Therefore, when interpreting the claimed limitations as broadly as is reasonably possible, the combination of the teachings of Huang and the teachings of Bacchi/Moh still meets the claimed limitation.

In response to the applicant's argument that "*While Wen clearly uses quaternary coding, this is irrelevant to the claimed invention...*" (see page 20, line 22+), the Wen simply provide an method of encoding information suing a quaternary code. Therefore, when interpreting the claimed limitations as broadly as is reasonably possible, the combination of the teachings of Wen and the teachings of Bacchi still meets the claimed limitation.

In response to applicant's argument that Zhang is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Zhang teaches a plurality of shape to increase the storage capacity within given coding area. Therefore, Therefore, when interpreting the claimed limitations as broadly as is reasonably possible, the combination of the teachings of Zhang and the teachings of Bacchi still meets the claimed limitation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure;

Matsui [US 5,897,669] discloses a information recording medium,

Pogge [US 4,256,514] discloses a forming of a silicon body.


Any inquiry concerning this communication or earlier communication from the examiner should be directed to Seung H. Lee whose telephone number is (703) 308-5894. The examiner can normally be reached on Monday to Friday from 7:30 AM to 4:00 PM.


If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee, can be reached on (703) 305-3503. The fax-phone number for this group is (703) 308-5841 or (703) 308-7722.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [michael.lee@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.


Seung H. Lee
Art Unit 2876
June 16, 2003


MICHAEL G. LEE
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